19. Describe the reactivity of platinum complexes, the influences of entering, leaving and other groups in substitution reaction.

20. Discuss the photo-sensitisation reactions of metal complexes and give its application in solar energy conversion.

NOVEMBER/DECEMBER 2023

DCH32/GCH32 — INORGANIC CHEMISTRY – III

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How are linear and bent nitrosyl groups identified by IR?

2. State 18 electron rule.

3. Highlight the importance of polymer bound catalyst.

4. Why is a high concentration of PPh3 essential for hydroformylation with rhodium catalyst?

5. What is the transition state in outer sphere mechanism?

6. Define Marcus Theory.

7. Explain trans effect with a suitable example.

8. Give any two influences caused by entering groups in substitution reactions?

9. What do you understand from solvolytic reactions?

10. What is the role of $[Ru(bpy)_3]^{2+}$ complex in solar energy conversion?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Write note on carbonylation and decarbonylation reactions of organometalic compounds.

Or

(b) Outline the structure and bonding characteristics of metal carbonyls.

12. (a) Discuss in detail the mechanism of oxidation of olefins (Wacker process).

Or

(b) Explain the cyclo oligomerisation of acetylene using Reppe's catalyst in detail.

13. (a) Explain briefly the mechanisms of inner sphere and outersphere complexes.

Or

(b) Discuss the role of bridging ligand in complexe formation reactions.

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14. (a) Describe the substitution reactions of square-planer complexes with suitable examples.

Or

(b) Discuss the pi-bonding theory of trans-effect.

15. (a) Discuss briefly the application of solvolytic reaction in synthesis of cobalt complexes.

Or

(b) Write a note on photo-substitution reactions of transition metal complexes.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the synthesis, structure and bonding of ferrocene.

17. Give an account on:

(a) Zeigler-Natta Catalyst (5)

(b) Wilkinson's Catalyst (5)

18. How are successor and precursor complexes formed? Explain briefly with suitable examples.